# APPENDIX H
# CLOSURE

1. Closure Requirements. Upon completion of waste treatment, the site will undergo closure activities. Closure can be separated into two categories: "clean closure" and "closure in place." Clean closure signifies that all waste was removed from the site and clean fill substituted to restore the site to its original condition. "Closure in place" signifies that some amount of hazardous waste or residue remains at the site.

Typical information included in a closure plan are:

- Closure requirements;
- Inventory of hazardous wastes at the site;
- Methods for disposing hazardous waste and treatment residuals;
- Procedures to decontaminate facility equipment;
- Planned monitoring activities (monitoring is required for 30 years for Superfund and RCRA sites); and
- Estimate of closure costs.

In some cases completion/closure of one activity will prepare the site for the next activity. For many site closures this may include a possible groundwater remediation phase. Activities may also include decontamination, if necessary, and demobilization of the desorber unit, water treatment unit, buildings, foundations, equipment and support facilities. To properly manage any treated residuals remaining at the site after completion of closure activities, a combination of deed restrictions, institutional controls and ground cover can be used to limit future site access and land use.

2. Disposal of Treated Materials and Residuals. Thermal desorption processes are ineffective for removing inorganic compounds and most metals from contaminated solids. The treated material must be analyzed in accordance with the Toxicity Characteristic Leachate Procedure (TCLP) for the presence of metals above threshold limits as defined in 40 CFR § 261. Residues generated from management of air emissions would only have to comply with land disposal restrictions if the ash/dust exhibits a hazardous waste characteristic, regardless of whether the original soil exhibited a characteristic. This would be the case because the air emissions residues could be considered to be a newly generated waste rather than the original treated soil. Even if the original soil was non-hazardous, there is the potential that

treatment residues may exhibit one or more hazardous waste characteristic, principally the metallic TCLP characteristics. As concentrations could vary by residue source, the treated soils should be analyzed separately from air emissions residues.

3. Backfilling of Treated Solids On-site. Providing that the treated solids meet all cleanup criteria and any applicable land disposal restrictions, it may be used on-site as backfill. This will avoid additional costs associated with transporting off-site backfill to the site and transporting and disposing of the treated solids. Also, to limit the amount of treatment residuals leaving the site, it is preferable to use the treated solids on-site as backfill.

Compaction specifications adhered to during backfilling activities will depend on the future use of the site. It is possible that there will be no compaction requirements if the site has future land use restrictions. The backfill area must be graded to provide stable slopes and to allow for adequate surface water drainage. Even if treated solids are used as backfill, off-site soil may still be required as a supplement to provide the desired grades.

Refer to the following document for guidelines on compaction and grading activities:

- TM-5-803-8, Land Use Planning, August 26, 1994. This manual provides guidance for Army personnel and consulting firms that prepare land use plans at Army Installations.

- TM 5-818-4, Backfill for Subsurface Structures, June 1983. Manual provides guidance for design, planning and execution of earthwork around deep seated or subsurface structures.

4. Landscaping. Gravel covering may be required to prevent environmental or human exposure to treated materials and remediated areas. A gravel cover is also used to promote surface water infiltration into the ground to facilitate a groundwater remediation system. A clay cap may be required if there is any material left on-site which does not meet cleanup criteria. The clay cap would prevent surface water from carrying contaminants from the materials into the groundwater. Uncovered areas and slopes, in particular, may have loam and seed applied to them for erosion and dust control. Wetlands which were disturbed or destroyed during remediation activities must be restored by bringing in approved backfill

and plants. Non-wetland areas that were disturbed by remediation activities may be restored with plantings for community relation purposes.

Refer to the following document for guidelines on planting:

- TM-5-803-13, Landscape Design and Planting, August 1988. This manual provides planting design guidelines
- CEGS 02110 Clearing and Grubbing
- CEGS 02210 Grading
- CEGS 02935 Turf
- CEGS 02950 Trees, Shrubs, Ground Covers and Vanes
- CEGS 02955 Crown Vetch

5. Demobilization. Demobilization will include activities required to disassemble and remove the desorber unit, buildings, foundations, equipment, supports and all auxiliary facilities from the site. If remediation work (e.g. groundwater remediation) is to continue at the site, some equipment and buildings may be left behind after the demobilization phase. Institutional controls, such as fencing and lighting, may be required around the perimeter of the site. These institutional controls will provide security for future remediation activities and to help prevent trespassers from coming in contact with remediated materials.

6. Site and Equipment Decontamination. Demobilization will include the decontamination of any buildings, foundations , supports or equipment that were located within the exclusion zone. The decontamination stations will be left intact until all necessary decontamination is completed. Once the water treatment unit, if any, is taken out of service, all decontamination water will need to be transported off-site for disposal.

7. Long Term and Short Term Monitoring Requirements. Monitoring requirements are generally determined on a site-by-site basis. Compliance monitoring occurs when hazardous wastes constituents have been detected in groundwater down gradient of the site. Monitoring wells may be required within and outside of the site if groundwater contamination is a concern. The frequency, duration and type of monitoring will depend on the extent and type of contamination at the site.

If groundwater monitoring is required, periodic reports showing analytical and depth to water data will need to be submitted to the appropriate agencies.

In addition to the groundwater monitoring, the site should be monitored to assure that the perimeter fencing and lighting are in good condition. Gravel or soil coverings should not have any damaged areas. If any of the institutional controls, gravel covering or clay caps are damaged, repairs should to be made.

Restored wetlands would require periodical monitoring inspections by regulatory agencies. To assure that an adequate percentage of the plantings are surviving, these inspections will include vegetation coverage estimates. Photographs are generally taken to document the progress of the restoration.